Tevatron collider progress: Nov '02 to Jan'02

I. Luminosity: → late Oct (5 stores #1906-1918)
Average initial peak L=28.3
→ early Jan (4 stores #2123-2138)
Average initial peak L=28.7

no progress in peak, record integral 7.1 pb-1/wk

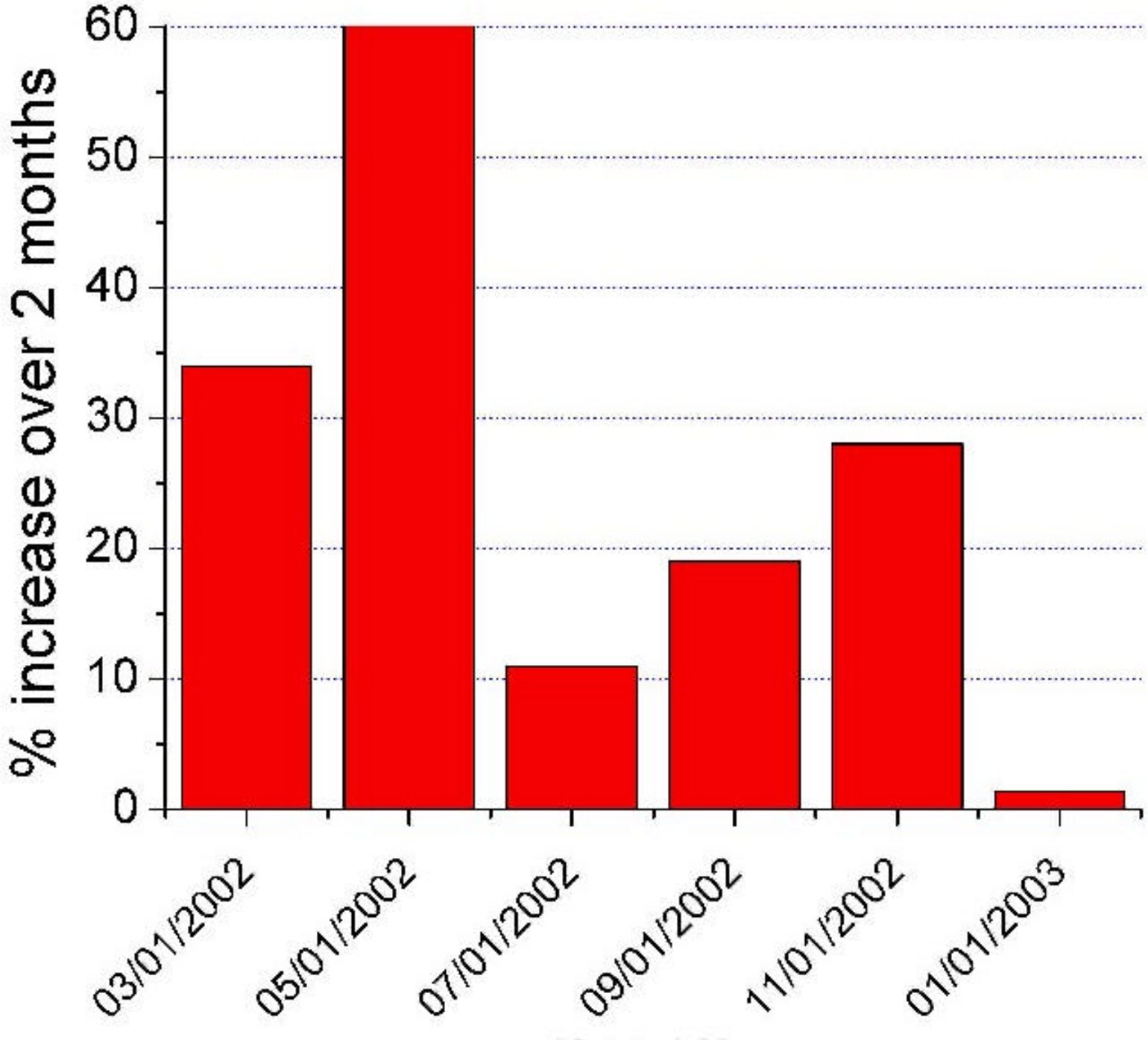
Record L as of Nov.1 36.1e30 store #1836

Record L as of Jan.1 36.7e30 store #1953 (Nov.7)

Reasons: - *run out of ideas*

- *just tuning does not help much in peak L*

Lifetimes of L, N_p are somewhat better (10-20%?)


% increase over 2 months
60
50
40
30
20
10
0
03/01/2002
05/01/2002
07/01/2002
09/01/2002
11/01/2002
01/01/2003

II. Reliability: → so-so

→ >40 pb-1 over last 2 mos (>20/mos in last 3)

→ 7.1 pb-1 in a record (last) week

→ studies do not affect reliability, *L_int* much

→ kicker prefires an issue – several quenches

→ orbit drifts a real issue

→ TEL problems : from time to time

→ problems with long/transv dampers

III. Technical progress:

- → prepared for 3-week shutdown: C0, Schottky, vacuum, TEL, alignment, CDF (many+JVolk)
- → survey data taken (Ray Stefansky)
- → SL/FW/collm analysis (AJ,FZ,VS)
- → better pbar Schottky (Markus Huening)
- → tunetracker ~works (Paul+)
- → 1st success in p-removal with collim (Tan)
- → new scan-software tested (Aimin+)
- → new abort gap counter at E0 (Alvin, Morris)
- → SBD dp/p, emm fixed; real rms σ_s (Instr)

Technical issues for next 2 months :

- → **execute Jan'03 shutdown projects**
  (C0, Schottky, Vacuum, Alignment, CDF, TEL)
- → recover after shutdown
- → finally FW/SL emittances (Andreas)
- → make new Schottky working (JimS, Andreas)
- → Finalize Tev BPM requirements (JS+)
- → Need of on-line C_v,h msmts (PI, Vic, Vahid)
- → What to do with kickers? (BH)
- → Start IPM re-development (Andreas,JVolk)
- → Get "old" pbar Schottky available (Markus)
- → Start installation of injection dampers
- → A48 collimators (Sasha Drozhdin, Dean +)

IV. Progress in Physics/Understanding:

- → Z_T =3-5 MΩ/m from Lambertsons (PI, AB)
- → New A-scan software tested (Aimin+)
- → a model of sqrt(time) losses (Valery)
- → luminosity scenario model (Valery+)
- → pbar tunes bunch-to-b meas'd (FZ,XLZ,VS,Tan)
- → promising results with octupoles (PI, Jerry)
- → new RF noise results (VS, John Reid, TD gus,VL)
- → b2 snaback measured (MM, Pierre Bauer)
- → lifetime vs tunes, C_v.h (TSen,FZ,XL,VS)
- → loss on ramp scales with C_v,h too (Tan)
- → indications of e-cloud (FZ)
- → WP scans with/w/o TEL (XLZ, Meiqin, Kip, VS)

Issues, Studies needed, After shutdown:

- → **injection mismatch (VL, AX, +MI guys)**
- → coupling effect on inj emittance (JA, PI, +)
- → P,Pbar loss on ramp 12% as before (TS, VS +)
- → Emittance blowup on ramp – real?
- → optimize dampers (JS, Tan)
- → 150 helix after C0 (Yuri, JohnJ, MM+)
- → decide upon A0 (MM, JohnJ, VL+)
- → make octupoles working (PI, JA)
- → TEL with Gaussian gun (TEL guys)

V. General comments:

a) Got enough time for studies again – need to deliver *peak L*
b) AAC review Feb.4 (VS, MM, JA, Valery)
c) Claudio Rivetta and Andreas Jansson joined Tev Dept
d) Jerry will arrange Tev operation training for newcomers
e) JimS, Tan and Dean got “Letters of Recognition” from the BD Head
f) discipline of beam studies strengthened (plans, forms)
g) 28 presentations at PAC’03, incl. 4 oral

VI. Expectations

(last time it was "**Peak luminosity of 3.7-4.4e31 early January**" we had 3.67…):

pbar/p emittance improved (<20pi H at 150/LB?) in 2 mos

(Tevatron coupling, A1/P 1 lines, better MI emm, Tev ramp)

→ some 5-10% luminosity increase

more pbars to LB in 2 mos

* better efficiency due to C0

→ 2-5% luminosity increase

* larger stack size (>190 mA)

→ some 4-8% luminosity increase

…**as the result →**

we break 40e30 early March